Shaughnessy Number: 114402

Date Out of EFGWB: JAN 16 1990

TO: T. Luminello
Product Manager 50
Registration Division (H7505C)

FROM: Michael Barrett, Acting Chief MRB
Ground-Water Section
Environmental Fate & Ground-Water Branch/EFED (H7507C)

THRU: Henry Jacoby, Chief Henry Jacoby
Environmental Fate & Ground-Water Branch/EFED (H7507C)

Attached, please find the EFGWB review of:.

Reg./File #: _____

Chemical Name: Acifluorfen

Type Product: Herbicide

Company Name: Rhone-Poulenc Ag Company and BASF Corporation

Purpose: Review of Progress Report Small Scale Retrospective Groundwater Monitoring Study and Limited Prospective Study

Date Received: 7-11-89 ACTION CODE: 660

Date Completed: 1-9-90 EFGWB #(s): 90-002

Monitoring study requested: X Total Review Time: 7 days

Monitoring study voluntarily: ___

Deferrals To: _____ Biological Effects Branch

_____ Science Integration & Policy Staff, EFED

_____ Non-Dietary Exposure Branch, HED

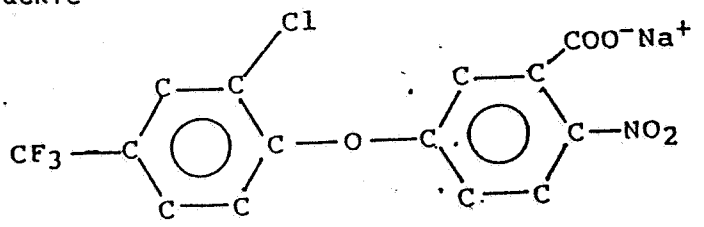
_____ Dietary Exposure Branch, HED

_____ Toxicology Branch, HED

1. CHEMICAL:

Chemical name: Sodium-5-{2-chloro-4-(trifluoromethyl)-phenoxy}-2-nitrobenzoate

Common name: acifluorfen-sodium salt
Trade name: Blazer/Tackle
Structure:



2. TEST MATERIAL:

Not Applicable.

3. STUDY/ACTION TYPE:

Review of progress report of Small-Scale Retrospective Groundwater Monitoring Study and Limited Prospective Field Dissipation Study with Acifluorfen-Sodium.

4. STUDY IDENTIFICATION:

Title: A Small Scale Retrospective Groundwater Monitoring Study and Limited Prospective Field Dissipation With Acifluorfen Sodium, the Active Ingredient of TACKLE Brand Herbicide and BLAZER Brand Herbicide.

Author: Frank Norris, Ph.D

Submitted by: Rhone-Poulenc Ag Company
Environmental Chemistry Department
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for: Rhone-Poulenc Ag Company and
BASF Corporation, Agricultural Chemicals

Identifying No.: 114401-03
Action Code: 660
Accession Number: 411600-01
Record Number: 253523
Date Sent to EFED: 10-13-89

5. REVIEWED BY:

Elizabeth Behl Signature: Eliz Behl
Hydrogeologist
OPP/EFED/EFGWB/Ground-Water Section Date: 1/9/90

6. APPROVED BY:

Michael R. Barrett Signature: Michael R Barrett
Acting Chief
OPP/EFED/EFGWB/Ground-Water Section Date: 1/10/90

7. CONCLUSIONS:

The objective of this review is to assess a progress report of small-scale retrospective and limited prospective (RLP) ground-water study of acifluorfen.

Monitoring has been initiated at five RLP sites located in Indiana, North Carolina, Virginia, Arkansas, and North Dakota. The last two sites were not approved by EFGWB prior to initiation of the study. At the time this progress report was written, only the Arkansas site had received an application of acifluorfen since the initiation of the study. This report deals only with the identification of selected sites, results of the site characterization, and the analysis of pre-existing acifluorfen residues in soil and ground water.

The Ground Water Section has major concerns about two issues on which the monitoring studies deviate from EPA's recommended protocol. The first issue is the short history of pesticide use at several of the sites. The second is that only two monitoring well clusters were installed at each site. Both of these issues are critical to the retrospective study design. In lieu of termination of the studies, the Ground Water Section recommended extended monitoring at sites with inadequate use histories, and the installation of a third well at each of the monitoring sties.

Acifluorfen was applied at 0.25 lb ai/A for these studies instead of the maximum use rate, because of information presented by the Registrants that this is the actual maximum usage rate. The Registrants must amend labels of products containing acifluorfen as the active ingredient to reflect the change in the maximum usage rate from 0.75 lb a.i./A to 0.25 lb a.i./A.

The Registrants focused their site selection on fields with sandy subsoils. EFGWB believes that the soil texture and organic matter content of the uppermost soil layer is at least as important as that of the subsoil in determining the potential for pesticides to migrate to ground water.

The site characterization for the monitoring study lacks information about the local hydrology, location maps, site specific hydrogeology, or site plans. The Ground Water Section requires this information in order to assess the suitability of sites and to place them into context whether or not pesticide residues are detected.

The soil sampling increments used in this study, especially in the root zone, are too large to adequately characterize variations in soil texture and pesticide residues. Four soil cores were not routinely collected to characterize the site. The number of cores varies from 1 to 4, in contrast to statements made in the progress report. The SCS soil series should be reported for each of the sites.

The location of wells in the field is not indicated with respect to the ground-water gradient, surface water features, or other wells. A third well cluster in a triangular configuration must be installed at the sites.

The screened interval must be reported. Well purging techniques must conform to established guidelines.

The location of recording weather stations is not given. This must be provided along with the distance to the sites.

Steps are itemized in the Discussion Section that detail how to proceed with the monitoring studies at each site.

8. RECOMMENDATIONS:

1. For all sites with only limited prior use of acifluorfen documented, additional acifluorfen applications must be made and the monitoring activities at these sties extended. See Discussion Section for details.

2. The Registrants must amend labels of products containing acifluorfen as the active ingredient to reflect the change in the maximum usage rate from 0.75 lb a.i./A to 0.25 lb a.i./A.

3. More information on site characterization about the local hydrology, location maps, site specific hydrogeology, and site plans must be submitted to the Ground Water Section. See Discussion Section for details.

4. The soil sampling increments used in this study, especially in the root zone, are too large to adequately characterize variations in soil texture and pesticide residues. Future sampling should be done using smaller increments as described in EPA's Guidance Document.

5. The SCS soil series should be reported for each of the sites.

6. The screened interval of each well must be reported.

7. Well purging techniques must conform to established guidelines.

8. The location of recording weather stations is not given. This must be provided along with the distance from the station to the sites.

9. Steps are itemized in the Discussion Section that detail how to proceed with the monitoring studies at each site.

9. BACKGROUND:

Tackle, manufactured by Rhone-Poulenc, is a selective post-emergence herbicide registered for use on soybeans and rice at application rates of 0.125 to 0.75 # ai/acre since 4/86. Blazer, manufactured by BASF, is a selective pre- and post-emergence herbicide for a wide spectrum of annual broadleaf weeds and grasses in soybeans, peanuts, and other large-seeded legumes.

Data submitted as part of the Ground-Water-Data-Call-In (GWDCI) indicate that acifluorfen is both persistent and mobile. The Environmental Fate One-liner (8/27/86) states that the free acid readily leaches in soil column experiments, but the degradation products are considered not to leach. Samples are usually analyzed for the acifluorfen-sodium (the salt), acifluorfen (free acid), the amino metabolite (LS-82-5281), and the desnitro product (LS-82-5283). Acifluorfen has been classified as a (B2, probable human) carcinogen, with a one-in-a-million risk level of 1 ppb.

Data reviewed for the Pesticides in Ground Water Database: Interim Report (1988) indicate that wells in 2 states have been analyzed for acifluorfen as a result of normal agricultural use. Acifluorfen has not been detected in these samples. EPA determined that the registrant should conduct a small-scale prospective monitoring study based on results of the GWDCI (9/15/87). Findings of pesticide residues in ground water during the prospective study, prompted the registrant to agree to conduct small-scale retrospective monitoring studies at different locations. Based on the results of the prospective monitoring study, the Registrant has indicated that they intend to restrict the sale of acifluorfen products in 8 counties in Wisconsin and 2 counties in New York.

10. DISCUSSION:

On October 11, 1989 representatives of Rhone-Poulenc (Karen Shearer, Russell Jones, and Frank Norris) and BASF (Jack Graham, and Karen Blundell) met with Chris Rice and Tom Luminello of OPP's Generic Chemical Support Branch and Elizabeth Behl and David Wells of OPP's Ground Water Section to discuss the final report on the prospective ground water monitoring study, and the on-going small-scale retrospective and limited prospective monitoring studies. Rhone-Poulenc responded to a series of questions by EFGWB related to the final report and agreed to supply additional information. Representatives of Rhone-Poulenc presented results of the first four months of monitoring at five monitoring sites.

Comments on the progress report of the small-scale retrospective and limited prospective study are discussed below. Comments on the completed prospective study are reviewed in EFGWB # 90701 (11/20/89). The protocol for the retrospective study has not been received by EFGWB to date. EFGWB requested that a retrospective study be done for this pesticide, and expects that all the requirements of the retrospective study will be met. Rhone-Poulenc has devised a new type of study type for this study called a Small-scale Retrpspective and Limited Prospective (RLP) Study. Monitoring, sampling, or analysis done by Rhone-Poulenc for an RLP study may exceed the requirements of the retrospective study design.

Monitoring has been initiated at five RLP sites located in Indiana, North Carolina, Virginia, Arkansas, and North Dakota. The last two sites were not approved by EFGWB prior to initiation of the study. At the time this progress report was written, only the Arkansas site had received an application of acifluorfen. This report deals only with the identification of selected sites, results of the site characterization, and

the analysis of pre-existing acifluorfen residues in soil and ground water; it is not a thorough review of the study protocol.

Site Selection.

Regions in which specific fields were located were selected based on sales information submitted from Rhone-Poulenc and BASF, producers of TACKLE and BLAZER, respectively. Major sales areas are: the Atlantic Coastal Region, the Mississippi Delta Region, the Central Midwest Region, and the North Central Region. Specific sites were selected from field research and sales representatives in these regions, who identified "specific fields with a minimum size of 4 ha, having soils susceptible to solute movement and which had a history of acifluorfen use". The progress report states that:

> " Several of the initial criteria had to be compromised due to actual agronomic practices:
>
> 1. Sequential Use. The finding that soybeans are seldom grown following soybeans because of rotational considerations means that the chance that acifluorfen-sodium use would follow a sequential year would be rare. Therefore the EPA reviewers allowed that the site selection consider sites on which the product had been used during the last season (considering only one season of use as compared to use during three of the last five seasons) and which may be used the subsequent season.
>
> 2. Use Rates. The EPA reviewers accepted the finding that the normal use rate for acifluorfen-sodium on soybeans or peanuts in the Atlantic Coastal Region was 0.25 lb ai/A, not the maximum use rate of 0.75 lb ai/A allowed by the label. The site criteria were changed to reflect the typical use rate. This was found to be the case throughout the acifluorfen-sodium use area."

Notes of meetings held between the Registrants and EPA reviewers (EFGWB) indicate the interpretation about waiving requirements for sequential use were interpreted differently by the two parties. EFGWB believes that an adequate history of prior use of the pesticide is a critical factor for selection of an adequate retrospective study site. The Ground Water Section agreed that the requirement of use in sequential years could be relaxed; however, a one season history of use is not adequate for such a study.

There is agreement that the pesticide may be applied at the typical rate of 0.25 lb ai/A instead of the maximum rate indicated on the label. Information submitted on site histories for this progress report indicates that at the North Dakota site Tackle was applied at the rate of 0.63 lb a.i./A, and at the Arkansas site Blazer was applied at the rate of 0.3 lb a.i./A. The Registrants must amend labels of products containing

acifluorfen as the active ingredient to reflect the change in the maximum usage rate from 0.75 lb a.i./A to 0.25 lb a.i./A.

Site Characterization.

When a potential site was identified, the farmer was interviewed, and several soil samples were taken using a bucket auger. The registrants considered the site to be acceptable if "the soil, especially the subsoil, was not clayey and felt at least somewhat sandy, and if no confining layers were present [between the soil surface and the water table]." EFGWB agrees in part with this statement, but believes that the soil texture and organic matter content of the uppermost soil layer is at least as important as that of the subsoil in determining the potential for pesticides to migrate to the subsurface.

At a meeting on November 21, 1989 the Ground Water Section expressed its concern that the site characterization for the monitoring study lacks information about the local hydrology, location maps, site specific hydrogeology, or site plans. This information is required in order to assess the suitability of the site and to place the site into context should pesticide residues be detected. The Ground Water Section requested that the registrant submit site plans that identify:

1. The location of wells and other monitoring sites in the field.

2. Direction of ground water flow and map of the water table surface.

3. The location of all relevant surface water features both on and off-site. This should include lakes, ponds, streams, creeks, bogs, swamps, and irrigation or drainage ditches.

Also, a location map should be included that shows the location of the field in the region. Maps should identify the nearest town, access roads, and latitude and longitude. The final report should include a discussion of local hydrology, site hydrogeology, and should discuss the implications of events such as periodic flooding or standing water at the study sites, if this occurs. The final report should also include plots of rainfall versus water table height, and rainfall versus detected pesticide concentrations, and a discussion of results.

The following is a critique of specific details presented in the progress report:

1. Soils.

   Soil sampling is required for the purpose of site characterization. The Draft Guidance for Ground-Water Monitoring Studies (Eiden et al.) recommends sampling at 6-inch increments for the first foot of soil, and 1-foot increments to the water table. The attached protocol indicates that samples were taken down to the water table at intervals of 0.3 m (1 ft) for the first 0.6 m (2 ft), and subsequently at 0.6 m (2 ft) intervals to a total depth of 4.2 m (14 ft). Soil in the

sample interval was thoroughly mixed and subsamples were taken for analysis. The samples were analyzed for soil texture and pesticide residues. The sampling increments used here, especially in the root zone, are too large to adequately characterize variations in soil texture and pesticide residues.

According to the progress report (p.10) the protocol requires that four soil samples be collected from different quadrants of a 4 Ha field (p.10). Data in the progress report indicates that 4 cores were taken at only 2 of the 5 sites. At 2 other sites 2 cores were taken and a single core was taken at the remaining site. This discrepancy should be cleared up and the progress report revised to indicate sampling that actually occurred.

The name of the soil (SCS soil series) must be reported.

2. Ground water. EPA's draft Guidance Document indicates that "a minimum of three "well clusters" are required for a field study [...] the wells should be constructed as part of the preestablished triangular formation necessary to determine the direction of shallow ground water flow". Two clusters of monitoring wells were installed at all study sites, separated by at least 100 m. The location of wells in the field with respect to the ground-water gradient, surface features, or other wells is not indicated.

   According to this progress report each well cluster has 3 wells positioned at 0.3, 1.5, and 3.0 meters below the water table. Information must also be provided about the screened interval.

   SOP 92602 (p. 4) recommends the use of cemented PVC casing. The Draft Guidance for Ground Water Monitoring Studies clearly states that "Joints of casing should be threaded and screwed together, not glued together" because of the possibility of contamination. The progress report indicates that well materials (casing and pump tubing) were "shown not to adsorb acifluorfen-sodium or its metabolites from aqueous solution".

   The well purging technique described in SOP 92602 (p. 10) involves removing a specific volume of water from each well prior to collecting the sample (five times the volume of water standing in the well). This technique is considered outdated and is not recommended. Instead, the specific conductance and pH of the water withdrawn from the well should be allowed to stabilize before collecting a sample. Again, this procedure is clearly described in OPP's draft Guidance document.

3. Climatic information. The progress report states that "Temperature and rainfall data will be collected from the nearest recording weather station". The location of these stations must be given, and the distance from the monitoring site. The recording station must be near enough to the site to represent the climate at the site.

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Analysis of Results and Data.

Only one of the five sites (Arkansas) had an application of acifluorfen during the current season. No analytical results were available at the time of this progress report.

On 11/21/89 a meeting was held between representatives of EPA, BASF, and Rhone-Poulenc to discuss the status of small-scale retrospective studies. At that meeting the Ground Water Section objected to the short history of pesticide use at several retrospective monitoring sites and that only 2 well clusters were installed at all sites. The Registrants agreed to install a third well cluster at all monitoring sites. At sites where the use history is too brief, the Registrants agreed to continue monitoring through a second application of the pesticide. The Ground Water Section requested more information and discussion of site characterization and details of the history of each monitoring sites. Steps were itemized detailing how to proceed with the study at each site. The following is a site by site summary:

Virginia. This site was approved by the Ground Water Section following a preliminary presentation of site characteristics in a meeting at EPA (8/5/88). Information presented in this progress report indicates that the soil is a Keyport sandy loam. One soil core was collected for analysis. Acifluorfen was applied to soybeans in 1988 (Tackle, 1 pt/A) and 1989 (Storm, 1.5 pt/A). Since only 2 wells were installed, the Ground Water Section requested (11/21/89) that an additional well be installed in December/January and all three wells be sampled at monthly intervals until the one year anniversary of the 1989 application. The Registrants agreed to do this.

North Carolina. This site was approved by the Ground Water Section following a preliminary presentation of site characteristics on August 5, 1988. Information presented in this progress report indicates that the soil is a loamy sand (no soil series provided). Two soil cores were collected for analysis. Acifluorfen was applied to soybeans and wheat (Blazer, 0.2-0.25 [1]) annually from 1985 through 1988. Since only 2 wells were installed, the Ground Water Section requested (11/21/89) that an additional well be installed in December/January and all three wells be sampled at monthly intervals until the one year anniversary of the 1989 application. The Registrants agreed to do this.

Indiana. This site was tentatively approved by the Ground Water Section in a telephone conversation on May 10, 1989. Monitoring results and pesticide use history were presented to the Ground Water Section in a meeting on October 10, 1989. Information presented in this progress report indicates that the soil is a sandy to sandy clay loam (no soil series provided). Two soil cores were collected for

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[1] units missing or incomplete in progress report

analysis. Acifluorfen was applied (Storm, 1.6 [2]) to soybeans only one time prior to initiation of the study. The Ground Water Section indicated (11/21/89) that this use history was unacceptable and requested that, in lieu of termination, the study be extended. Since only 2 wells were installed, the Ground Water Section requested that an additional well be installed. The Registrants agreed to conduct the study according to the following scenario:

1. Samples will be taken monthly, weather permitting, otherwise the existing wells will not be sampled again until Spring 1990.

2. A new (third) well cluster will be installed as soon as possible, weather permitting, and at the latest in the Spring 1990.

3. Pre-treatment ground-water samples will be taken in the Spring of 1990 from all wells.

4. Acifluorfen will be applied again according to schedule and label instructions.

5. Ground water will be sampled monthly from all wells beginning after pesticide application and continuing until Winter (November) 1990.

North Dakota. This site was not approved in advance of initiation of the study. Monitoring results and pesticide use history were presented to the Ground Water Section in a meeting on October 10, 1989. Information presented in this progress report indicates that the soils are Hamar-Ulen and Averson fine sandy loams. Four soil cores were collected for analysis. Acifluorfen was applied two times in the same year (Blazer, 1 pt/A, Tackle 2.5 pt/A) to soybeans prior to initiation of the study. The Registrant stated (11/21/89) that little of the second application of the pesticide probably reached the ground, and was retained instead on the canopy. The Ground Water Section indicated that this usage history was unacceptable and requested (11/21/89) that, in lieu of termination, the study be extended. Since only 2 wells were installed, the Ground Water Section requested (11/21/89) that an additional well cluster be installed. The Registrants agreed to conduct the study according to the following scenario:

1. Samples will be taken monthly, weather permitting, otherwise the existing wells will not be sampled again until Spring 1990.

2. A new (third) well cluster will be installed as soon as possible, weather permitting, and at the latest in the Spring 1990.

3. Pre-treatment ground-water samples will be taken in the Spring of 1990 from all wells.

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[2] units missing or incomplete in progress report

4. Acifluorfen will be applied again according to schedule and label instructions.

5. Ground water will be sampled monthly from all wells beginning after pesticide application and continuing until Winter (November) 1990.

Arkansas. This site was not approved in advance of initiation of monitoring. Monitoring results were presented in a meeting with EPA on October 10, 1989. Information presented in this progress report indicates that the soil is a loam to silt loam (no soil series provided). Four soil cores were collected for analysis. Acifluorfen was applied annually from 1986 through 1988 (Blazer, 0.3 lb/A) each year for the previous three years. Only 2 well clusters were installed at the site. Although the history of pesticide use at the site is acceptable, the Ground Water Section indicated that the number of wells is unacceptable, and requested (11/21/89) that in lieu of termination of the study, an additional well cluster be installed.

Soils at this site have a high clay content, although the Registrant claims that they are lighter than most soils in Arkansas on which soybeans are grown. The high clay content and location of the field (between the Mississippi River and the levy) have created access problems. The Ground Water Section feels that useful information can be obtained from this site bearing in mind its limitations, providing that the soil is representative soils in Arkansas on which soybeans are grown. The Ground Water Section has discussed their concerns directly with Rhone-Poulenc. The Registrants agreed to conduct the study according to the following scenario:

1. A new (third) well cluster will be installed in December/January (1989/1990).

2. Samples will be taken from all wells every other month for the next six months, or more when feasible.

3. If there is standing water in the field it will be sampled as well (2 to 3 samples per event).